REMARKS

Claims 17 and 23 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. The applicants respectfully submit that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated March 23, 2005.

Claims 1 - 23 are currently pending in this patent application, claims 1, 16, 17 and 23 being independent claims.

The applicants thank the Examiner for maintaining the allowability of claims 1 - 16.

As to the merits of this case, the applicants also thank the Examiner for now withdrawing his previous reliance on the Kim and Kusakabe references (both of record).

However, the Examiner now relies on new references (namely, Buchanan (U.S. Patent Publication No. 2003/0211648), Ajisawa (U.S. Patent No. 5,825,047), Vilela (U.S. Patent No. 5,800,630) and Watanabe (Japanese Patent Publication No. 6-90016)) in setting forth the following rejections in the outstanding Action:

(1) claims 17 - 20 stand rejected under 35 USC §102(e) as being anticipated by Buchanan;

(2) claims 17, 21 and 22 stand rejected under 35 USC §103 based on Ajisawa in view of Vilela; and

(3) claim 23 stands rejected under 35 USC §103 based on Watanabe in view of Vilela.

The applicants respectfully request reconsideration of these rejections.

First, the applicants' claimed semiconductor light-receiving device, as set forth in independent claim 17, clearly includes a unique and distinguishable claimed structural arrangement in which the claimed high-concentration semiconductor intermediate tunneling layer allows electrons to go through this layer to the buffer layer by virtue of the tunnel effect. Consequently, the high-frequency response characteristics and the high-input saturation characteristics of the photodiode are improved.

The applicants' claimed invention, as now set forth in independent claim 17, is directed to a semiconductor light-receiving device having a semi-insulating substrate; a semiconductor layer of a first conduction type that is formed on the semi-insulating substrate; a buffer layer of the first conduction type that is formed on the semiconductor layer; a light absorption layer that is formed on the buffer layer and generates carriers in accordance with incident light; and a semiconductor layer of a second conduction type that is formed on the light absorption layer. Such claimed semiconductor light-receiving device, as now recited in independent claim 17, further includes a high-concentration semiconductor intermediate tunneling layer of the first conduction type that is interposed between the buffer layer and the light absorption layer and has a higher impurity concentration than the buffer layer. As now further recited in claim 17, the semiconductor intermediate tunneling layer allows electrons to pass therethrough to the buffer layer due to a tunnel effect.

Significant claimed structural arrangements of the applicants' claimed semiconductor light-receiving device, as now recited in claim 17, include the claimed high-concentration semiconductor intermediate tunneling layer of the first conduction type that is interposed between the buffer layer and the light absorption layer and has a higher impurity concentration than the buffer layer. Also a significant claimed structural arrangement, now set forth in claim 17, is the claimed semiconductor intermediate tunneling layer allowing electrons to pass therethrough to the buffer layer due to a

tunnel effect. See, the discussions of the second embodiment of the applicants' invention in lines 9 - 36, page 10 of the applicants' specification and the applicants' Figure 2 in support of claim 17.

In contrast, Buchanan teaches, in Figure 7 thereof, a layer structure that has an LED on the lower side and a QWIP (quantum well infrared photodetector) laminated thereon. That is, the LED and the light-receiving diode are vertically stacked (see paragraphs 0119 and 0115 in Buchanan). The applicants respectfully submit that the layers 4g, 4e, 4f pointed out by the Examiner are all used to form the LED and are not related to the light-receiving diode. Of course, the layer 4e is not the light absorption layer. Thus, the discussion of the impurity concentrations of the layers 4g, 4e, 4f in the outstanding Action does not make any sense.

In view of the above, it is submitted that since not all of the claimed elements, as now recited in independent claim 17, are found in exactly the same situation and united in the same way to perform the identical function in Buchanan, there can be no anticipation under 35 USC §102(e) of the claimed invention (now set forth in claim 17) based on the teachings of Buchanan.

Furthermore, claims 18 - 20 depend on claim 17, and further limit the scope of claim 17. Thus, at least for the reasons set forth above with respect to claim 17, claims 18 - 20 should now be similarly allowable.

In view of the above, the withdrawal of the outstanding anticipation rejection under 35 USC §102(e) based on Buchanan is in order, and is therefore respectfully solicited.

Second, as to the outstanding obviousness rejection under 35 USC §103 based on Ajisawa in view of Vilela, Ajisawa teaches an optical semiconductor device, more specifically, an optical modulator. As acknowledged by the Examiner, Ajisawa's clad layer 65 is not the tunneling layer.

The Examiner then relies on Viela and states that Figure 4 thereof shows a light-receiving device and the third layer from the bottom of the device is a high-concentration semiconductor intermediate tunneling layer. However, the device taught by Viela is not the light-receiving device and is nothing less than a tunneling diode in which the p^{++} layer and the n^{++} layer are directly joined to form the tunneling junction. The third layer has a higher impurity concentration than the second layer from the bottom, while the fourth layer laminated on the third layer has a high impurity concentration of the opposite type and no light absorption layer is provided.

However, the teachings of Vilela of relative impurity concentrations among its layers (as shown in Vilela's Figure 4) do not change the fact that Ajisawa was not and will still not be concerned with any band discontinuity between its buffer layer and its light absorption layer, as discussed above. It is further noted that Vilela's third layer from the bottom (considered by the Examiner to reflect the applicants' claimed tunneling layer) is not interposed between a buffer layer

and a light absorption layer. Thus, Vilela is similarly not concerned with tunneling; and a person of ordinary skill in the art would not find any reason to combine the teachings of both references to meet the applicants' claimed invention.

Accordingly, a person of ordinary skill in the art would not have found the applicants' claimed invention, as now set forth in claim 17, obvious under 35 USC §103 based on Ajisawa in view of Vilela. Thus, the withdrawal of the outstanding rejection under 35 USC §103 based on Ajisawa in view of Vilela is in order, and is therefore respectfully solicited.

Third, with respect to the outstanding rejection under 35 USC §103 based on Watanabe in view of Vilela, the Examiner's reliance on Watanabe's relative impurity concentrations does not resolve its drawbacks or deficiencies, as in the Ajisawa - Vilela pairing discussed above, in not being concerned with trying to resolve the problem of band discontinuity between a buffer layer and a light absorption layer. Thus, a person of ordinary skill in the art would not have found the applicants' claimed invention, as now set forth in claim 23, obvious under 35 USC §103 based on Watanabe in view of Vilela.

Accordingly, the withdrawal of the outstanding obviousness rejection under 35 USC §103 based on Watanabe in view of Vilela is in order, and is therefore respectfully solicited.

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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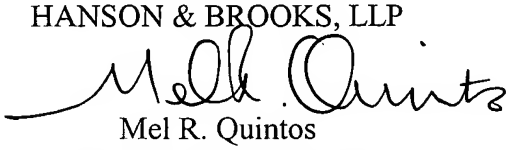

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